



**NOAA  
FISHERIES**

**Southwest Fisheries  
Science Center**

# **Theme II – Agenda Item 3.3 Overview of Assessment Processes for Groundfish, HMS and CPS**

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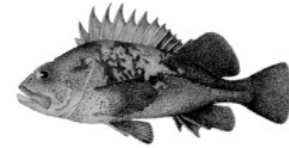
## Theme II (Agenda Item 3): Overview of Assessment Process

**Is the assessment process efficient, effective and clearly described, including terms of reference for assessment reports?**

# Taxonomic Groups in the Groundfish FMP

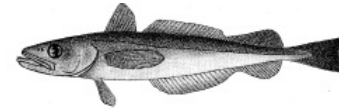
"Rockfish"

63



Roundfish

6



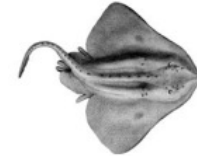
Flatfish

12



Elasmobranchs

6



"Others"

3



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Total:

90

- Over 90 stocks in the Groundfish FMP, insufficient data for many stocks
- NWFSC has Groundfish lead, SWFSC conducts ~30% of assessments
  - ✓ 8-10 total benchmarks per cycle plus data poor and data moderate

# Principal Species in the PFMC's HMS-FMP (n=11)

## ISC (SWFSC leads within NMFS):

Albacore Tuna  
*Thunnus alalunga*



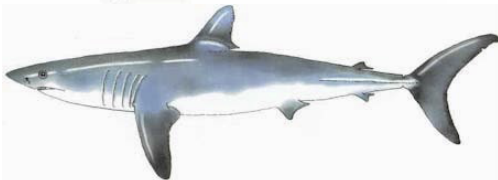
Pacific Bluefin Tuna  
*Thunnus orientalis*



Blue Shark  
*Prionace glauca*



Shortfin Mako Shark  
*Isurus oxyrinchus*



Common Thresher Shark  
*Alopias vulpinus*

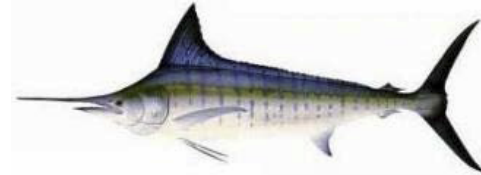


## ISC (PIFSC leads within NMFS):

Broadbill Swordfish  
*Xiphias gladius*



Striped marlin  
*Kajikia audax*



## IATTC Lead Responsibility:

Yellowfin Tuna  
*Thunnus albacares*



Bigeye Tuna  
*Thunnus obesus*



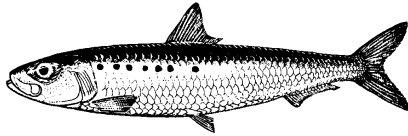
Skipjack Tuna  
*Katsuwonus pelamis*



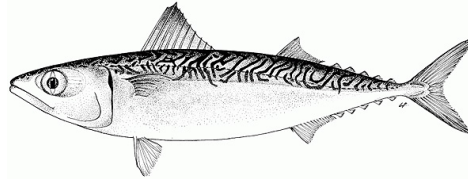
Dolphinfish  
*Coryphaena hippurus*



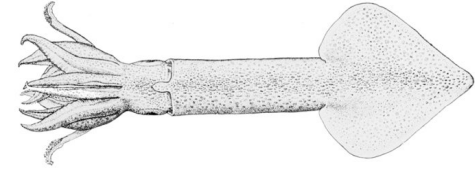
# Principal Species in the PFMC's CPS-FMP



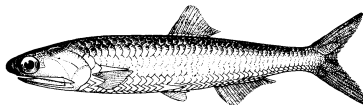
Pacific Sardine  
Northern subpopulation  
*Sardinops sagax caerulea*



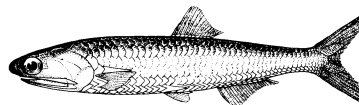
Pacific (Chub) Mackerel  
*Scomber japonicus*



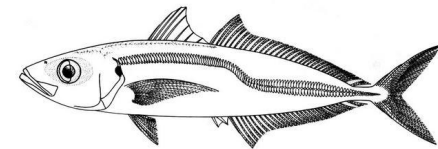
Market Squid  
*Doryteuthis opalescens*



Northern Anchovy  
Central subpopulation  
*Engraulis mordax*



Northern Anchovy  
Northern subpopulation  
*Engraulis mordax*

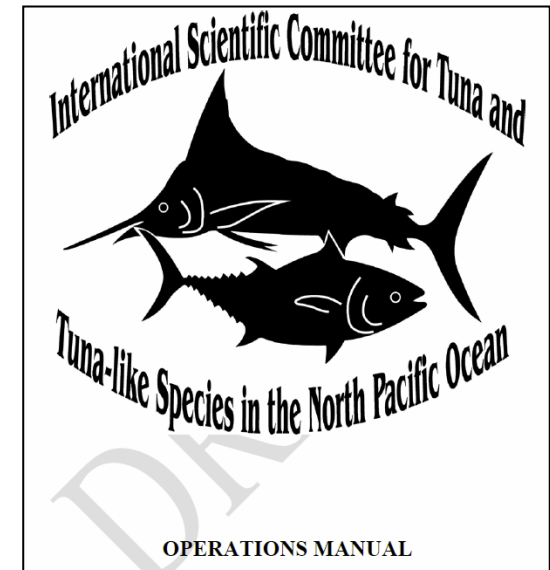
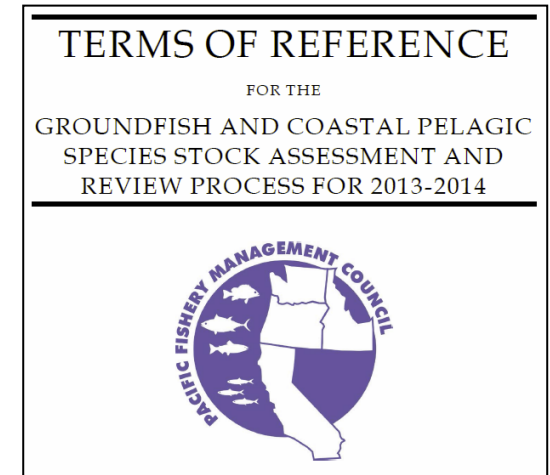


Jack Mackerel  
*Trachurus symmetricus*

- SWFSC has lead responsibility for research, survey, and assessment;
- Sardine and Pacific mackerel formally assessed & actively managed;
- Other species 'monitored' (landings, surveys); no annual harvest specs.

## a) Is there an explicit Terms of Reference (ToR) for conducting and reporting assessments?

- See (1) PFMC's ToR for the Groundfish and Coastal Pelagic Species Stock Assessment and Review Process' and (2) ISC's Operations Manual (HMS);
- ToRs are vague with regard to conducting an assessment. There is presently no 'Good Practices Guide'. Description of the model selection process, as well as sensitivity and uncertainty analyses, are expected;
- ToRs are quite explicit regarding documenting and reporting the stock assessment;
- The stock assessment review process will be more fully discussed under agenda items 5.0 (Lindley) and 5.1 (Teo).



## b) Do reports provide a complete description of the work and a concise summary? Yes, see PFMC & ISC ToRs.

- Executive summary (concise yet thorough)
- Introduction: stock structure, biology, fisheries and previous assessments
- Assessment data: catch, compositions, abundance time series
- Model description: population dynamics, fishery dynamics, likelihood components, priors or constraints
- Model selection and evaluation: model assumptions, likelihood profiles, residuals
- Base Model Results: parameters estimates, fits to data, population numbers/biomass
- Uncertainty and Sensitivity Analyses: parameter uncertainty, sensitivity to data set choices and weightings, retrospective/prospective/historical analyses
- Stock projections (Groundfish and HMS)
- Harvest control rules and/or stock status relative to BRPs
- Stock assessment reports are typically 200-400 pages long and usually compiled in very short order.



## c) Do assessments adequately and incrementally build upon past assessments and reviews?

- For PFMC's Groundfish and CPS assessments:
  - Assessment report is expected to contain a section describing changes from the previous assessment and responses or updates regarding past STAR panel and SSC research recommendations. Last sardine report contained eight pages of responses to past reviews;
  - Report must also contain a description of changes from previous assessment(s), as well as a historical analysis of biomass and recruitment;
- ISC assessments tend to build upon past approaches due to nature of ongoing collaboration in the international working groups;
- In general, the degree to which assessments are revised depends in part on:
  - Availability of new data;
  - New modeling approaches (data moderate model recently used for cowcod);
  - New perspectives on modeling approaches (fresh sets of eyes)

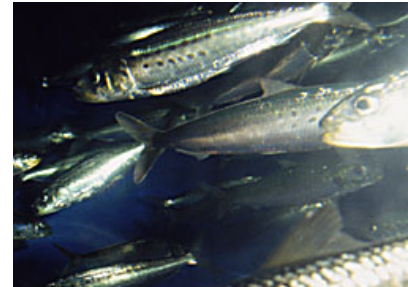
## d) Are there clear protocols for delivering draft assessment products to peer reviews?

- As time allows, the STAT asks for feedback from FRD or FED colleagues throughout the assessment process. For CPS and Groundfish, there is typically no time for formal internal review prior to submission for external review. Timing of data and analysis constrained;
- For PFMC full assessments (CPS & Groundfish) draft reports and supporting documentation are expected to be delivered to Council staff and the STAR Panel Chair 3 weeks in advance and the complete STAR panel 2 weeks in advance of the review.
  - Materials posted to an FTP site that is updated throughout the review;
  - Following the STAR panel review, final report provided to PFMC 2-3 weeks in advance of the Council meeting, where it will undergo more layers of review (SSC, MT, AS);
- Assessment update reviews and deadlines differ between CPS and Groundfish;
- For HMS, stock assessment reports are completed following the last WG meeting and are due to the ISC Chairperson at least three weeks prior to the plenary. ISC's 'blessed' assessments are subsequently provided in advance to appropriate committees (e.g., SC of the WCPFC; SAC of the IATTC).



## e) Is involvement of assessment scientists in preliminary data preparation and analysis sufficient to utilize their statistical expertise, but not burdensome?

- Groundfish assessment analysts responsible for most data preparation and analysis. Much of the survey data must be requested from NWFSC (or other partners) and lag times to receiving the data can slow the process. NWFSC typically leads development of GLMM routines (but does not specify or run GLMMs) for trawl survey data, often develops GLMM indices for hook and line survey data.
- CPS assessment analysts responsible for all data preparation and analysis (apart from survey estimates). Survey groups analyze survey data and provide final point estimates to assessment analysts. Fishery data preparation is burdensome to the stock assessment analysts, as we currently lack infrastructure or staffing for CPS data management (see 2013 MSRA Review).
- HMS assessment analysts prepare data associated with U.S. fisheries (small portion of total yields). Majority of fishery data are owned, prepared, and provided by other countries (e.g., Japan, China, Taiwan, Korea, Mexico). Lack of access to raw data from other countries presents a challenge to the U.S. scientists, given our need to evaluate objectivity of other's analyses.



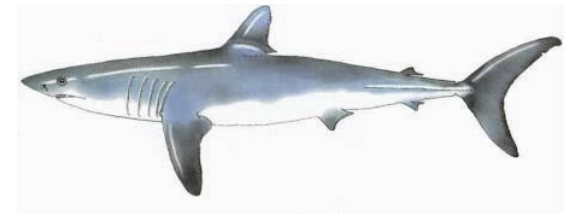
**f) Are there protocols for consistently dealing with technical issues, as appropriate to the stock, for example: calibration of catchability, consideration of dome-shaped and time-varying selectivity, natural mortality, estimation of stock productivity, characterization of uncertainty, etc.?**

- There are no strict protocols presently for dealing with most of these of technical issues;
- General modeling diagnostics (expected products) are outlined in the ToRs, however, the best approaches to addressing model misspecification will vary case-by-case;
- Analysts must rely on shared expertise, scientific literature, guidance from other STAR panels and workshops. For Groundfish, new methods and guidance (e.g., priors, data weighting approaches) are generally widely disseminated and used within an assessment cycle by most analysts, largely via informal networking.
- ‘Good Practices Guides’ for stock assessments are needed. Given the broad range of topics to be addressed, as well as the broad range opinions as to how best to approach the problems, this will likely require an iterative, step-by-step focus on key subject areas (e.g., selectivity, growth, natural mortality, stock-recruitment)



## g) Are there protocols in the assessment process for conducting sensitivity analyses and evaluation of risk?

- Ditto the response to question ‘f’ (previous slide). Sensitivity analyses typically focus on relative influence of various data sources, influence of data weighting, etc., and will vary on a case-by-case basis (assessment-specific, more or less);
- Approaches to evaluating risk are outlined and applied to Groundfish assessments (see PFMC’s ToR), where decision tables are provided for the base model;
- Uncertainty in stock assessments is accounted for (to some extent) by the application of a ‘P-star’ buffer between the OFL and ABC.



# Strengths, Challenges, and Strategies

## Strengths:

- Primary assessment tool (Stock Synthesis) is well-tested and has a large user group;
- Peer-review process is rigorous and transparent, has stabilized over time;
- High profile species are assessed well as possible given the available data;
- Increasing number of assessment methods (data rich, data moderate, data poor) to provide advice for stocks with different levels of data quality; true for groundfish, less so for CPS and HMS



# Strengths, Challenges, and Strategies

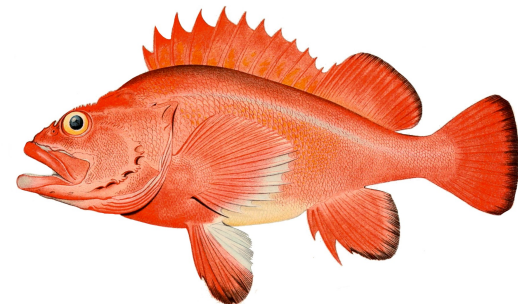
## Challenges:

- Timing and volume of analyses for each assessment, including updates;
- STAR panels can be a highly compressed process, in some cases allowing little time for reflection and forensics before the final base case is agreed;
- Data access/management:
  - Groundfish – data management less than ideal, queries often take long time, allowing less time for analysis. This issue highlighted in NWFSC data review and is currently being addressed;
  - CPS – no single point-source for fishery data. Lack of support for database management and preliminary data preparation;
  - HMS – lack of access to raw data (other countries);
- Less time than desired for conducting research;
- Lack staffing/expertise to develop management strategy evaluations for CPS & HMS;
- Large number of Groundfish species, many with little fishery independent data, and small number of assessment scientists and capacity to cover all stocks.

# Strengths, Challenges, and Strategies

## Strategies:

- For CPS, modify STAR panels into a two-phase, iterative process for modeling work. This is likely impractical for Groundfish given number of assessments during a cycle;
- Work with Council staff and SSC to streamline and facilitate more updates over full benchmark assessments;
- Reduce reporting requirements for assessment updates;
- Reduce administrative and programmatic demands on current staff;
- Continue improvements in data management, data access and data analysis to support assessments;
- Recruit new staff, encourage more engagement and involvement by states and other partners.



Questions?

